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DLA PIPER RUDNICK GRAY CARY US, LLP			AMARI, ALESSANDRO V	
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			2872	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/751,034

Applicant(s)

VAN DRIENHUIZEN ET AL.

Examiner

Alessandro V. Amari

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2005.  
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.  
 4a) Of the above claim(s) 10 and 25-32 is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-9, 11-15, 19 and 22-24 is/are rejected.  
 7) ☒ Claim(s) 16-18, 20 and 21 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 7/7/2004.

- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) ☐ Notice of Informal Patent Application (PTO-152)  
 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Species 8 in the reply filed on 13 October 2005 is acknowledged. Claims 10 and 25-32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 7 July 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed (i.e., WO 01/94253A2; WO2003/102631). It has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Objections***

3. Claims 3-5 are objected to because of the following informalities:

Regarding claim 3, the phrase, "the pedestal is sized to support the device layer" is confusing and ambiguous since according to the recitation in claim 2, the device layer forms the pedestal. Claim 4 inherits the same issue.

Regarding claim 5, the phrase "the pedestal connects to an opposite surface of the device layer" is confusing and ambiguous since the device layer forms the pedestal as recited in claim 2.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-6, 8, 9, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaeriyama US 5,497,262.

In regard to claim 1, Kaeriyama discloses (see Figure 2, 12) a MEMS apparatus comprising a base support (31, 32, 33, 23a); a planar support layer (21) having a support surface; hinge elements (22) coupled to said support layer and to said base support movably suspending said support layer from said base support, the hinge elements being disposed in a different plane from said support layer as shown in Figures 2 and 12; and a bulk element (14, 16a) supported on said support surface, the bulk element having an optical surface as described in column 2, lines 50-67.

Regarding claim 2, Kaeriyama discloses (see Figure 12) that the bulk element comprises a device layer having a portion forming a pedestal (see part of element 14, element 16a) that connects the device layer to said support surface, said optical surface being on said device layer as described in column 5, lines 42-49.

Regarding claim 3, Kaeriyama discloses (se Figure 12) that the pedestal is sized to support the device layer a predetermined distance from the support layer as shown in Figure 12.

Regarding claim 4, Kaeriyama discloses that the pedestal is sized to position the bulk element a sufficient distance from the support layer to afford a predetermined angular movement as shown in Figures 2 and 12.

Regarding claim 5, Kaeriyama discloses that the pedestal connects to an opposite surface of the device layer from the optical surface as shown in Figure 12.

Regarding claim 6, Kaeriyama discloses that the optical surface has an area with dimensions that are of the order of outer dimensions of the base support as shown in Figures 2 and 12.

Regarding claim 8, Kaeriyama discloses that the support layer has dimensions which are less than the outer dimensions of the base support as shown in Figure 12.

Regarding claim 9, Kaeriyama discloses (see Figure 12) an actuator disposed within a cavity in the base support (see area between elements 23a) for causing the support layer to move about an axis defined by a hinge element as described in column 3, lines 30-67.

Regarding claim 11, Kaeriyama discloses (see Figure 12) that each of the hinge elements has a U-shape (see element 22 as it curves around element 23a) as shown in Figure 12.

Regarding claim 12, Kaeriyama discloses that the optical surface of the bulk element comprises a reflective layer as described in column 5, lines 42-50.

6. Claims 1, 9, 11, 12, 14, 15, 19, 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Michalicek et al US 6,028,689.

In regard to claims 1 and 14, Michalicek et al discloses (see Figures 1-6) a MEMS apparatus comprising a base support (20, 21); a planar support layer (14) having a support surface; hinge means or elements (16) for suspending said support layer relative to said base support for movement about two axes as described in column 3, lines 40-48, the hinge means or elements being disposed in a different plane from said support layer as shown in Figure 3; and a bulk element (12) comprising a device layer (13) having an optical surface supported on said support surface.

Regarding claim 11, Michalicek discloses that each of the hinge elements has a U-shape as shown in Figures 1 and 3.

Regarding claim 12, Michalicek discloses that the optical surface of the bulk element comprises a reflective layer as described in column 2, lines 14-18.

Regarding claim 15, Michalicek et al further discloses (see Figures 2-6) a pedestal (18) that supports the device layer on said support surface, said pedestal being sized to support the device layer a predetermined distance from the support layer.

Regarding claim 19, Michalicek et al discloses (see Figures 2-6) that the hinge means comprises a frame (11) having first hinge elements (see portions connected to support post 18) that suspend the frame relative to the base support for movement about a first axis and a second hinge element (see portions connected to extreme sides of element 14) that suspends the support layer relative to the frame for movement about a second axis as shown in Figures 2-6.

Regarding claim 23, Michalichuk et al discloses that the frame is dimensioned to be stiff relative to the first and second hinge elements as shown in Figures 2-6.

Although the prior art does not specifically disclose the claimed stiffness of the frame, this is seen as an inherent teaching since the frame must have rigidity in order for the device to operate as intended.

Regarding claims 9 and 24, Michalichuk et al further discloses (see Figures 2-6) actuators (22, 24) disposed within a cavity in the base support for causing the support layer to move about two axes as described in column 2, lines 14-34.

7. Claims 1, 9, 11, 12, 14, 15, 19, 23 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Mei et al US 6,512,625.

In regard to claims 1 and 14, Mei et al discloses (see Figures 1, 7) a MEMS apparatus comprising a base support (12); a planar support layer (22) having a support surface; hinge means or elements (20) for suspending said support layer relative to said base support for movement about two axes as shown in Figure 7, the hinge means or elements being disposed in a different plane from said support layer as shown in Figure 1; and a bulk element comprising a device layer having an optical surface supported on said support surface as described in column 12, lines 5-9.

Regarding claims 9 and 24, Mei et al discloses (see Figure 1) actuators (14, 16) disposed within a cavity in the base support for causing the support layer to move about two axes.

Regarding claim 11, Mei et al discloses (see Figure 7) that each of the hinge elements has a U-shape (70a) as shown in Figure 7.

Regarding claim 12, Mei et al discloses that the optical surface of the bulk element comprises a reflective layer as described in column 12, lines 5-9.

Regarding claim 15, Mei et al discloses (see Figure 1) a pedestal (24) that supports the device layer on said support surface, said pedestal being sized to support the device layer a predetermined distance from the support layer.

Regarding claim 19, Mei et al discloses (see Figure 1) that the hinge means comprises a frame (18, 26) having first hinge elements (see portions connected to element 24) that suspend the frame relative to the base support for movement about a first axis and a second hinge element (see portions connected to element 24) that suspends the support layer relative to the frame for movement about a second axis.

Regarding claim 23, Mei et al discloses (see Figure 1) that the frame is dimensioned to be stiff relative to the first and second hinge elements. Although the prior art does not specifically disclose the claimed stiffness of the frame, this is seen as an inherent teaching since the frame must have rigidity in order for the device to operate as intended.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaeriyama US 5,497,262.



Regarding claim 7, Kaeriyama teaches the claimed invention except for the optical surface having at least one dimension that is greater than a corresponding outer dimension of the base support. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the dimensions of the optical surface, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the dimensions of the optical surface of Kaeriyama for the purpose of targeting for a particular wavelength for optimizing for a particular optical application. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaeriyama US 5,497,262.

Regarding claim 13, Kaeriyama teaches the invention as set forth above but does not teach that the support layer comprises silicon and that the hinge elements are formed from thin film material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize silicon for the support layer and for the hinge elements to be formed from thin film material, since it has been held to be within the ordinary skill of a worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to utilize silicon and thin film material for the apparatus of Kaeriyama for the purpose of ease of manufacture. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945)

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michalichek US 6,028,689.

Regarding claim 7, Michalichek teaches the claimed invention except for the optical surface having at least one dimension that is greater than a corresponding outer dimension of the base support. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the dimensions of the optical surface, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the dimensions of the optical surface of Michalichek for the purpose of targeting for a particular wavelength for optimizing for a particular optical application. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

12. Claims 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Michalichek US 6,028,689.

Regarding claims 13 and 22, Michalichek teaches the invention as set forth above and teaches that the frame comprises a unitary structures as shown in Figures 2-6 but does not teach that the support layer comprises silicon and that the hinge elements are formed from thin film material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize silicon for the support layer and for the hinge elements to be formed from thin film material, since it has been held to be within the ordinary skill of a worker in the art to select a known material on the basis of its suitability for the intended use. One would have been

motivated to utilize silicon and thin film material for the apparatus of Michalichek for the purpose of ease of manufacture. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945)

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mei et al US 6,512,625.

Regarding claim 7, Mei et al teaches the claimed invention except for the optical surface having at least one dimension that is greater than a corresponding outer dimension of the base support. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the dimensions of the optical surface, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the dimensions of the optical surface of Mei et al for the purpose of targeting for a particular wavelength for optimizing for a particular optical application. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

14. Claims 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mei et al US 6,512,625.

Regarding claims 13 and 22, Mei et al teaches the invention as set forth above and that the frame comprises a unitary structure as shown in Figure 1 but does not teach that the support layer comprises silicon and that the hinge elements are formed from thin film material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize silicon for the support layer and for the

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hinge elements to be formed from thin film material, since it has been held to be within the ordinary skill of a worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to utilize silicon and thin film material for the apparatus of Mei et al for the purpose of ease of manufacture.

*Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945)

***Allowable Subject Matter***

15. Claims 16-18, 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claim 16 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the pedestal is sized to position the device layer a sufficient distance from the support layer to afford a predetermined angular movement" as set forth in the claimed combination.

Claim 17 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "an intermediate support element disposed between the base support and the support layer and wherein the hinge means comprises first hinge elements suspending the support layer relative to the intermediate support element and second hinge elements suspending the intermediate support element relative to the base support" as set forth in the claimed combination. Claim 18 is also allowable based upon its dependence on claim 17.

Claim 20 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the second hinge element is connected to

opposite sides of the frame and is disposed within an opening in the frame” as set forth in the claimed combination.

Claim 21 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, “a support plate connected to the second hinge and to the support layer” as set forth in the claimed combination.

The prior art of record teaches a MEMS apparatus comprising a base support; a planar support layer having a support surface; hinge means for suspending said support layer relative to said base support for movement about two axes, the hinge means being disposed in a different plane from said support layer; and a bulk element comprising a device layer having an optical surface supported on said support surface, a pedestal that supports the device layer on the support surface and wherein the hinge means comprises a frame having first hinge elements that suspend the frame relative to the base support for movement about a first axis and a second hinge element that suspends the support layer relative to the frame for movement about a second axis. However, the prior art of record does not teach that the pedestal is sized to position the device layer a sufficient distance from the support layer to afford a predetermined angular movement or that an intermediate support element disposed between the base support and the support layer and wherein the hinge means comprises first hinge elements suspending the support layer relative to the intermediate support element and second hinge elements suspending the intermediate support element relative to the base support or that the second hinge element is connected to opposite sides of the frame and is disposed within an opening in the frame or that a support plate connected

to the second hinge and to the support layer and there is no motivation or teaching to modify this difference as derived.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Orcutt et al US 2002/0034024 teaches an MEMS apparatus comprising a base support, a planar support layer having a support surface, hinge elements being disposed in a different plane from said support layer as shown in Figures 3b and 5.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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08 November 2005

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